

WHAT IS CLAIMED IS:

1. A brake rotor comprising:
 - a first and a second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;
 - a first slot provided on the first annular braking surface; and
 - a first opening, wherein all or a portion of the first opening being provided within the first slot
2. The rotor according to claim 1, further comprising a hat portion disposed in the central portion and adapted for mounting the rotor to a vehicle;
3. The rotor according to claim 1, wherein the first opening allows the first annular surface to fluid communicate with a vent.
4. The brake rotor according to claim 1, wherein the first opening corresponds in size to the first slot.
5. The brake rotor according to claim 4, wherein size comprises at least one of diameter, length and/or width.
6. The brake rotor according to claim 1, wherein the vent is provided proximate a periphery of the brake rotor.
7. The brake rotor according to claim 1, wherein the vent is provided proximate a the central portion of the brake rotor.
8. The brake rotor according to claim 1, wherein the first opening fluid communicates with the vent via a flow channel.
9. The brake rotor according to claim 8, wherein the flow channel is provided between the inner and outer circumferential surfaces.
10. The brake rotor according to claim 9, wherein the flow channel is defined by a pair of vanes provided between the inner and outer circumferential surfaces.

11. The brake rotor according to claim 1, further comprising a plurality of vanes provided between the inner and outer circumferential surfaces, wherein at least a pair of vanes defines a flow channel having a first flow channel opening provided near the central region and a second flow channel opening provided near a periphery of the brake rotor, wherein the first opening fluid communicates with the vent via the flow channel.
12. The brake rotor according to claim 1, further comprising a second slot provided for on the second annular surface and a second opening, wherein all or a portion of the second opening being provided within the second slot and wherein the second opening fluid communicates with the first opening and/or the vent.
13. The brake rotor according to claim 12, wherein the second opening corresponds in size to the second slot.
14. The brake rotor according to claim 13, wherein size comprises at least one of diameter, length and width.
15. The brake rotor according to claim 12, wherein the second slot corresponds in size and position to a size and position of the first slot.
16. The brake rotor according to claim 1, further comprising a plurality of the first slots each having at least one first opening in communication with a vent.
17. The brake rotor according to claim 16, further comprising a plurality of the second slots each having at least one second opening in communication with a vent.
18. The brake rotor according to claim 17, wherein each second slot corresponds in size and position to a corresponding first slot.
19. The brake rotor according to claim 18, wherein each second opening of each second slot corresponds in size and position to a corresponding first opening of a corresponding first slot.
20. The brake rotor according to claim 1, wherein all or a portion of the first slot is substantially straight.

21. The brake rotor according to claim 1, wherein the first slot includes a curve.
22. A brake rotor comprising:
 - a first and second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;
 - a first slot provided on the first annular braking surface;
 - a first opening, all or a portion of which being provided within the first slot; and
 - a second opening, in fluid communication with the first opening and the second annular braking surface.
23. The brake rotor according to claim 22, further comprising a hat portion disposed in the central portion and adapted for mounting said rotor to a vehicle;
24. The brake rotor according to claim 22, wherein the first opening corresponds in size to the first slot.
25. The brake rotor according to claim 24, wherein size comprises at least one of diameter, length, and width.
26. The brake rotor according to claim 22, wherein the second opening, all or a portion of which being provided within a second slot provided on the second annular braking surface.
27. The brake rotor according to claim 26, wherein the second opening corresponds in size to the second slot.
28. The brake rotor according to claim 27, wherein size comprises at least one of diameter, length, and width.
29. The brake rotor according to claim 26, wherein the second opening and the second slot each respectively correspond to the first opening and the second slot.
30. The brake rotor according to claim 22, wherein the first opening and the second opening include substantially similar sizes.

31. The brake rotor according to claim 22, further comprising a plurality of vanes provided between the inner and outer circumferential surfaces, wherein at least one pair of vanes of the plurality of vanes defines a flow channel having a first flow channel opening provided near the central region and a second flow channel opening provided near a periphery of the brake rotor.
32. The brake rotor according to claim 31, wherein the first opening is in fluid communication with the flow channel.
33. The brake rotor according to claim 31, wherein the second opening is in fluid communication with the flow channel.
34. The brake rotor according to claim 31, wherein the first opening and the second opening are in fluid communication with the flow channel.
35. The brake rotor according to claim 22, further comprising a plurality of first slots each provided on the first annular surface, wherein each first slot includes at least one first opening.
36. The brake rotor according to claim 22, further comprising a plurality of second slots corresponding to each of the first slots, wherein each second slot is provided on the second annular surface and wherein each second slot includes at least one second opening corresponding to a respective first opening.
37. A slot for a braking surface for a braking device comprising:
 - an elongated groove having at least one of a diameter, a depth, a width and a length; and
 - at least one first opening, wherein all or a portion of the first opening is provided within the slot.
38. The slot according to claim 37, wherein the first opening is in fluid communication with a vent of the braking device.
39. The slot according to claim 37, wherein the first opening corresponds in size to the first slot.

40. The slot according to claim 37, wherein size comprises at least one of diameter, length and/or width.
41. A method of communicating gases and/or material from a braking surface of a braking device comprising:
- providing at least one first slot in the braking surface, wherein the slot includes at least one first opening, wherein all or a portion of the first opening is provided within the slot and wherein the opening is in fluid communication with a vent; and
- communicating gases and/or material from the first braking surface as a result of friction between a braking pad and the first braking surface to the vent via the first opening.
42. The method according to claim 41, wherein the first opening corresponds in size to the first slot.
43. The method according to claim 42, wherein size comprises at least one of diameter, length and/or width.
44. The method according to claim 41, further comprising providing a corresponding second slot for each of the at least one first slots, wherein
- the corresponding second slot is provided on a second braking surface of the braking device and includes a second opening;
- all or a portion of the second opening is provided within the second slot; and
- the second opening is in fluid communication with the first opening.
45. The method according to claim 44, wherein the second opening corresponds in size to the second slot.
46. The method according to claim 45, wherein size comprises at least one of diameter, length and/or width.

47. A method of communicating gases and/or material from a braking surface of a brake rotor comprising:

providing:

at least one first slot having at least one first opening on a first annular braking surface of a brake rotor, wherein all or a portion of the first opening is provided within the slot; and

a corresponding second slot for each of the at least one first slots, wherein the corresponding second slot is provided on a second annular braking surface of the brake rotor and includes a second opening, wherein all or a portion of the second opening is provided within the second slot and wherein the second opening is in fluid communication with the first opening;

and

communicating gases and/or material from the first annular braking surface produced as a result of friction between a first braking pad and the first annular braking surface toward the second slot via the first opening.

48. The method according to claim 47, wherein the first and/or second openings correspond in size to the first and/or second slots, respectively.
49. The method according to claim 48, wherein size comprises at least one of diameter, length and/or width.
50. A brake rotor comprising:

a first and second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;

a hat portion disposed in the central portion and adapted for mounting said rotor to a vehicle;

a plurality of vanes provided between the inner and outer circumferential surfaces, wherein a plurality of corresponding flow channels are defined between at least a pair of vanes of the plurality of vanes, and wherein each flow channel includes a first flow channel opening provided near the central region and a second flow channel opening provided near a periphery of the brake rotor;

a plurality of first slots provided on the first annular braking surface;

a plurality of second slots provided on the second annular braking surface corresponding to the plurality of first slots;

at least one first opening, all or a portion of which being provided within each first slot; and

at least one second opening, all or a portion of which being provided within each second slot, wherein each second opening of each second slot corresponds substantially to and fluid communicates with a first opening of a first slot.

51. The brake rotor according to claim 50, wherein the first and/or second openings correspond in size to the first and/or second slots, respectively.
52. The brake rotor according to claim 51, wherein size comprises at least one of diameter, length and/or width.
53. A vehicle having a disc brake system including one or more disc brake rotors, each comprising:
 - a first and a second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;
 - a first slot provided on the first annular braking surface; and
 - a first opening, wherein all or a portion of the first opening being provided within the first slot.

54. A vehicle having a disc brake system including one or more disc brake rotors, each comprising:
- a first and second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;
 - a first slot provided on the first annular braking surface;
 - a first opening, all or a portion of which being provided within the first slot; and
 - a second opening, in fluid communication with the first opening and the second annular braking surface.
55. A vehicle having a disc brake system including one or more disc brake rotors, each comprising:
- a first and second annular braking surfaces jointly defining inner and outer circumferential surfaces and a central portion;
 - a hat portion disposed in the central portion and adapted for mounting said rotor to a vehicle;
 - a plurality of vanes provided between the inner and outer circumferential surfaces, wherein a plurality of corresponding flow channels are defined between at least a pair of vanes of the plurality of vanes, and wherein each flow channel includes a first flow channel opening provided near the central region and a second flow channel opening provided near a periphery of the brake rotor;
 - a plurality of first slots provided on the first annular braking surface;
 - a plurality of second slots provided on the second annular braking surface corresponding to the plurality of first slots;
 - at least one first opening, all or a portion of which being provided within each first slot; and

at least one second opening, all or a portion of which being provided within each second slot, wherein each second opening of each second slot corresponds substantially to and fluid communicates with a first opening of a first slot.